

# **A Virtual Tour of NASA Glenn Research Center's Plum Brook Station: *Test Sites* *and* *Natural Landscapes***







# Welcome to NASA GRC's Plum Brook Station!

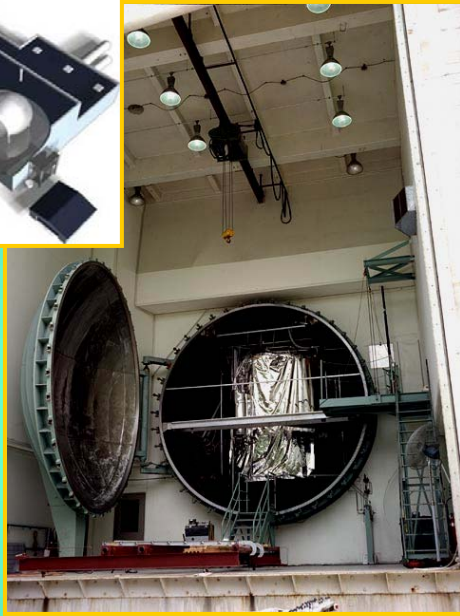
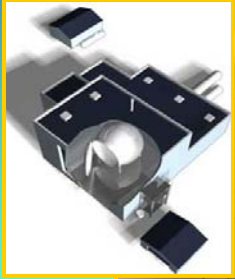
*Plum Brook Station (PBS) is home to five world class space flight and technology testing facilities*

*The Station's land area is about 10 square miles, or about the size of Independence or Sandusky, OH*

*All of this space gives the test sites the exclusion zones they require to operate safely...*



***...These test facilities include...***



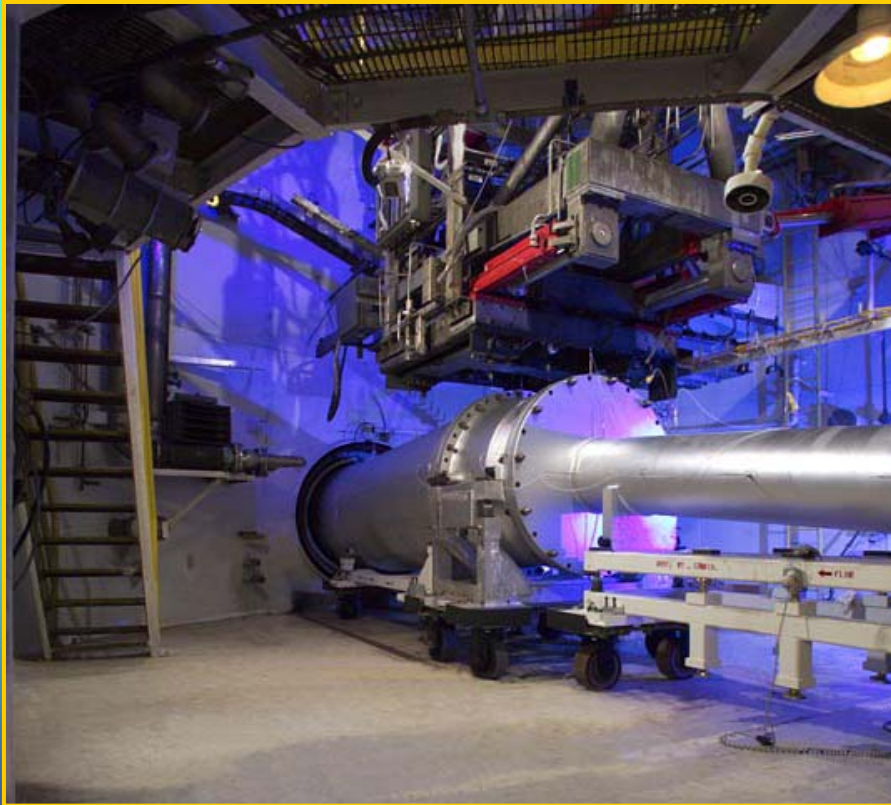
**K-Site** (Cryogenic Propellant Tank Facility), the only test chamber of its kind that can get dirty, making it perfect for experiments involving lunar dust or conditions on Mars and Venus



**CCL** (Cryogenic Components Laboratory), a new state-of-the-art facility where high pressure gases and cryogenic components are used to re-create the extreme temperature and pressure conditions found during space missions

## ...These test facilities include...

**HTF** (Hypersonic Tunnel Facility), the only propulsion test site in the US that can be used to mimic flight conditions in up to 7 times the speed of sound in *clean air*



**B-2** (Spacecraft Propulsion Research Facility), the only place in the world where a full-sized rocket engine can be fired while simulating the cold and vacuum of space

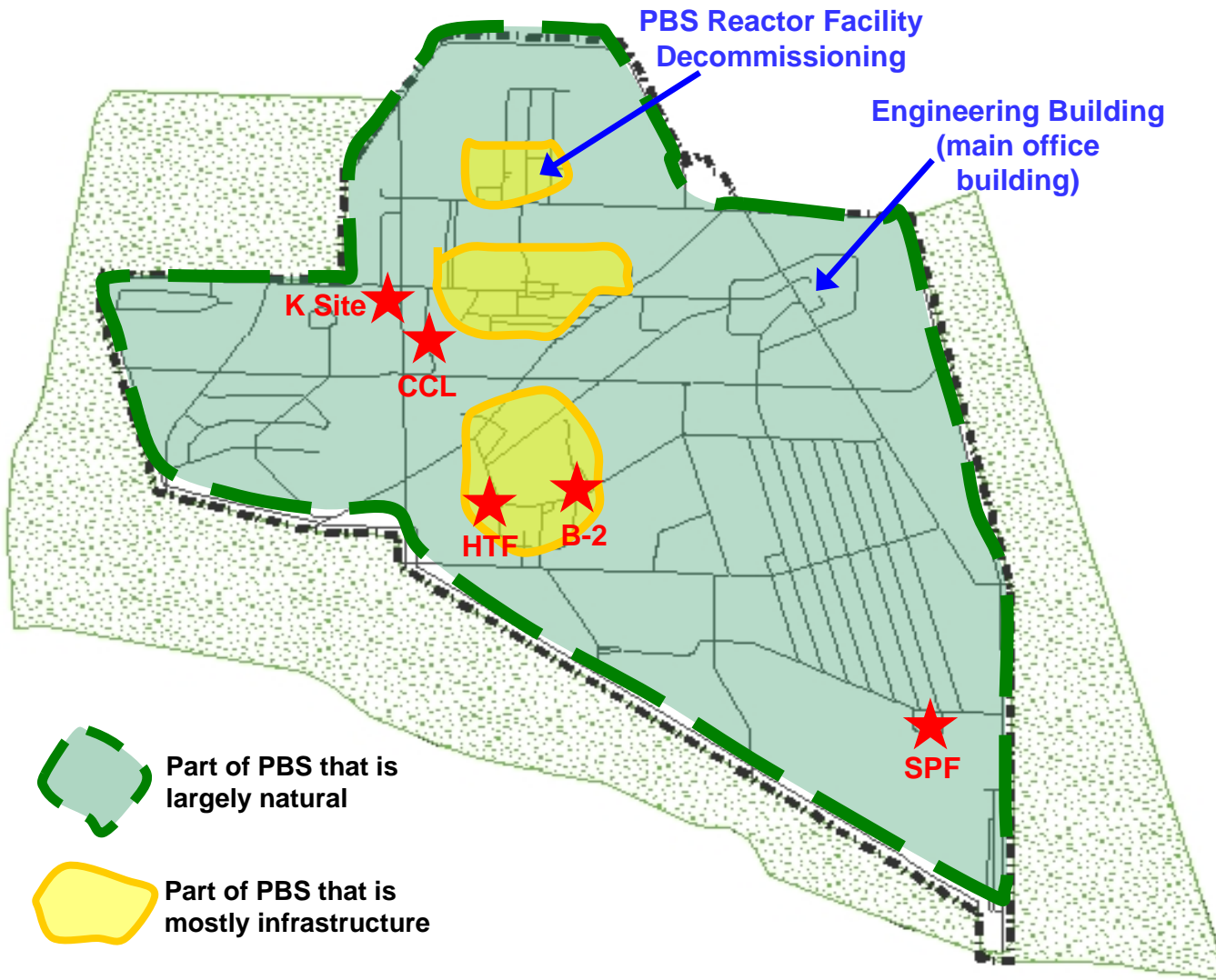


## *...These test facilities include...*

**SPF** (Space Power Facility), the world's largest space environment simulation chamber (100 ft wide, 122 ft tall); no one has built anything close to its size anywhere in the world. SPF is currently being prepared to test Orion spacecraft for the extreme mechanical vibrations spacecraft experience during launch and the acoustic vibrations they experience while being sent into orbit.



*So, what else does a place of this size contain?*  
As you can see, PBS has a lot of natural areas...



NASA Glenn Research Center  
Plum Brook Station



## *...Plum Brook Station has:*

- *Wild Forests*
- *Oak Savannas*
- *Ancient Prairies*
- *Open Meadows*
- *Flowing Streams*





# Wild Forests

*Forests and woodlands, including rare oak savannas,  
managed for high quality*

**Scattered, open-canopy oaks and hickories.**





# Ancient Prairies

*Tallgrass prairies from pre-settlement times*



# Ancient Prairies

*Many rare species,  
some only in Ohio at Plum Brook Station*



Blazingstar

*Liatris scariosa*



Virginia Meadow Beauty

*Rhexia virginica*



Rough White Lettuce

*Prenanthes aspera*



# Open Meadows

*Former crop fields, now weedy or brushy*



Efforts undertaken to suppress weeds and brush  
To be restored to prairie



# Flowing Streams



Pipe Creek – flows through PBS, drains large watershed

Plum Brook – headwaters in PBS, drains much of the Station

Numerous drainage ditches – maintain roads and structures



*In fact, there are parts of PBS where...*

The landscape looks  
just as it was over  
200 years ago...



And you can hear  
nothing but the singing  
of song birds and the  
rustling of leaves in the  
breeze!

# *In pre-settlement times...*

## Native Americans **Created** PBS's natural environments with fire

For thousands of years, Native Americans burned savannas and prairies in the area which now includes PBS.

Fire was used to herd deer for hunting and to keep forests and landscapes open for easy travel, food gathering, and hunting activities.





# For PBS, landscape fires are not destructive!

- Fires promote native prairie plants and savanna forest plants.
- Fires suppress modern weeds and brush.
- Fires provide valuable wildlife habitat.



*Today...*

**NASA is managing and restoring PBS's prairies and forests to conserve their rare species and landscapes**

**Prescribed field burning is only one of many techniques used in conservation efforts**



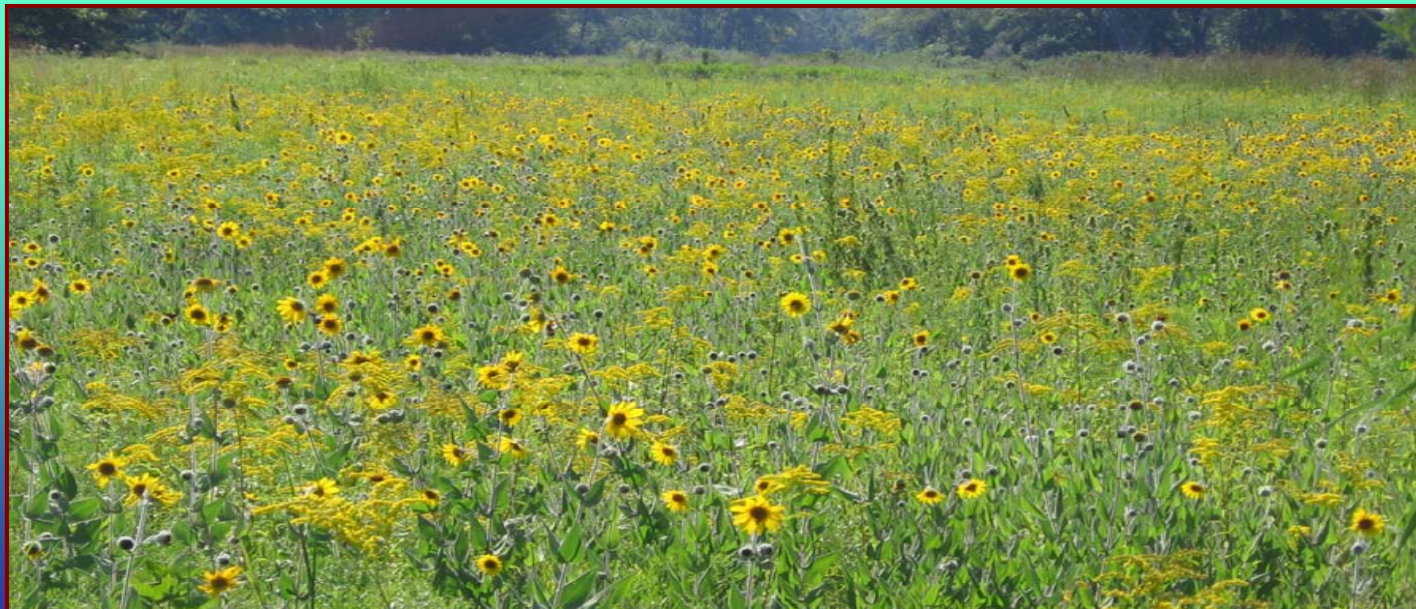


***In fact,*** “Exercise responsible stewardship of natural resources at Plum Brook Station...”

is Objective #1 in GRC’s Environmental Management System (EMS) targets this year

PBS has a Species Management Plan to help set priorities for this responsible stewardship year after year

**Without such proactive management and conservation...**





**...These things will happen at PBS...**

**Dogwood brush will overtake Open Meadows and Prairies**

**Without Management:**



**With Management:**





***Without proper management...***

**...these things will happen at PBS...**

**Invasive weeds will degrade meadows and ditches**



**Phragmites overtaking ditches**



***Without proper management...***

**...these things will happen at PBS...**

**Deer will overpopulate the Station, overgraze, and begin to die from starvation**



**Deer overpopulation**

**Controlled population**





***Without proper management...***

***...these things will happen at PBS...***

**Rare plant species may disappear**



***Michigan Lily***

Approx. 24 plants at PBS



***Rare Blazingstar***

Approx. 200 plants at PBS



***Rough White  
Lettuce***

Approx. 36 plants  
at PBS

# Techniques used in PBS Species Management efforts:

- Removal of weeds and brush with herbicides and machinery.
- Removal of deer by licensed hunters in controlled hunts.
- Propagation and planting of rare plants.
- Strategic use of fire to suppress weeds and promote native plants.





# Goals and Outcomes of the PBS Species Management Plan:

- Sustained, self-renewing native plant and animal populations
- Minimize environmental threats (weeds, etc.)
- Reduce long-term landscape maintenance costs
- Enhanced natural aesthetics for NASA GRC Master Plan at PBS
- Continue NASA's commitment to environmental stewardship

